of cannibalizing dedicated access revenues by deploying DSL. Still others such as MFS and Focal were at the vanguard of offering competitive collocation and local connectivity to ISPs, altering the process and economics of Internet provisioning.[6]

As a result of the '96 Act, five major groups of carriers set out to re-build the last mile. The facilities-based CLECs, Utility Telecoms, IXCs, ILECs, and cable broadband providers spend considerable amounts in anticipation of participating in this telecom revolution. These are the groups we have assessed for this report.

Facilities-Based CLEC Spending

We first look at the capital spending of the companies directly stemming from the '96 Act—the facilities-based CLECs. To capture the capital expenditure total for this group, NPRG executed a two-step process. First, we broke down the facilities-based CLEC industry into four sub-categories: Traditionally Voice-Focused CLECs; Independent Operating Carrier (IOC)-owned CLECs; Utility CLECs; and data CLECs (DLECs)[7] and Fiber LECs (See Table 2 below). This enabled us to make sure that all relevant companies were considered. Second, we calculated capital expenditure totals for all companies, aggregated these numbers by sub-category, and then created a total aggregating all four sub-categories.

[illegible]
Traditionally Voice-Focused CLECs
IOC-Owned CLECs
Utility Telecoms
DLECs (including BLECs) & Fiber LECs

Source: New Paradigm Resources Group, Inc.

NPRG utilized its proprietary data and research (primary/secondary) and relied on its expertise in the telecommunication space as a basis for the first sub-category, facilities-based CLECs. Table 3 lists some of the carriers that we analyzed for this sub-category. We aggregated yearly capital expenditure numbers for all public and private carriers[8] for the years 1996-2001.

[6] See Tomlinson, p. 291, in which MFS Chairman Jim Crowe is quoted as saying "when the players are able to bundle local and long distance Internet service provision, there will be an alignment. There will be tremendous opportunity for those that have facilities in the bottleneck portion of that equation which continues to be the local loop...Our facilities in the local loop are no less valuable for the provision of Internet services than they are for the provision of voice services."

[7] Through our coverage of the DLECs, we also look at the Building Local Exchange Carriers (BLECs).

[8] For private carriers, we attempt to capture a number or range through ongoing discussions with management. We also develop capital expenditure models based on discussions with a wider group of personnel at each company, on an analysis of the amount of infrastructure deployed by each company, and on an assessment of total funding.

We chose to exclude the capital spending of CLEC resellers and ISPs that have invested in infrastructure for planned deployment of voice or for Internet phone service. Reseller spending would have likely occurred in the absence of the '96 Act. Moreover, it is certainly minimal. Regarding Internet telephony expenditures, it is doubtful that a realistic estimate could be calculated. And again, the capital spending total is small and would not materially affect overall numbers.

Allegiance Telecom, Inc.	Mpower Communications
AT&T Corp. (Local)	Time Warner Telecom, Inc.
Cablevision Lightpath, Inc.	Winstar Communications
Focal Communications Corp.	WorldCom, Inc. (Local)
McLeodUSA, Inc.	XO Communications

Source: New Paradigm Resources Group, Inc.

Table 4 lists our capital expenditure calculations for the traditionally voice-focused CLECs by year for the period 1996-2001.

Year	1996	1997	1998	1999	2000	2001	Total (1996-2001)
Capital Expenditures	$1,550	$3,076	$5,938	$9,999	$13,890	$9,998	$44,451

Source: New Paradigm Resources Group, Inc.

The next sub-category was those IOC-owned CLECs pursuing an edge-out strategy.[9] Edge-out CLECs have relied on their parents' infrastructure and reputations to compete in adjoining BOC territories. But for the '96 Act, these carriers would have been prohibited from such an "out-of-territory" strategy. Table 5 provides a sampling of the 102 carriers analyzed for this sub-category.

CenturyTel, Inc.	Northland Communications Group
CTSI, Inc.	NTELOS, Inc.
HickoryTech	Otter Tail, Inc.
Logix Communications Enterprises, Inc.	TDS Metrocom
Madison River Communications	XIT Communications

Source: New Paradigm Resources Group, Inc.

[9] See NPRG's *Competitive IOC Report*™ for more information on 102 such operations.

NPRG fully analyzed 32 of the companies in the category. As for the remaining 70, we developed a model to estimate capital spending, using conservative assumptions. These 70 companies constitute a small percentage of total capital spending. For example, the 2001 estimated capital expenditure total for these 70 came to only 28.5% of ALLTEL's entire competitive telecom spending, and less than 10% of all category capital spending for the year.[10]

Table 6 provides the yearly totals for the IOC-owned CLEC sub-category.

Year	1996	1997	1998	1999	2000	2001	Total (1996-2001)
Capital Expenditures	$0	$2	$81	$260	$502	$571	$1,416

Source: New Paradigm Resources Group, Inc.

The next sub-category of CLECs we analyzed for this study was the utility-owned CLECs.[11] Table 7 provides a sampling of the 10 companies assessed.

These carriers are CLECs organized by utility companies to take advantage of the '96 Act. They differ from the utility telecoms in the next section in that, as CLECs, they provide local dial tone. The utility telecoms are non-certified wholesale transport providers.

Black Hills FiberCom, L.L.C.	MP Telecom
Digital Teleport Inc.	Reliant Energy Communications, Inc.
ExOp of Missouri, Inc.	TXU Communications

Source: New Paradigm Resources Group, Inc.

Table 8 provides the yearly totals for the utility CLEC sub-category.

[10] It also important to note here that while we developed a complete list of IOCs presently edging out of territory through a CLEC operation, many of the other approximately 975 ILECs across the U.S. are preparing to roll out such service. Some have only upgraded their technology with the expectation of edging out of territory and begin competing with other ILECs; others have actually purchased additional equipment for their CLEC strategy. We have not attempted to capture an estimate of this total as it would be difficult to measure and any calculation would be highly speculative.

[11] See NPRG's *Utilities in Telecom Report*™, 2nd Edition, for more information on these carriers.

Year	1996	1997	1998	1999	2000	2001	Total (1996-2001)
Capital Expenditures	$30	$40	$121	$652	$580	$649	$2,072

Source: New Paradigm Resources Group, Inc.

The next sub-category, the DLECs and Fiber LECs, is itself made up of many sub-groups, including the competitive DSL and Gigabit-Ethernet (Gig-E) players (see Table 9 for a sampling of these companies), the Building Local Exchange Carriers (BLECs) (see Table 10), and the Fiber LECs (see Table 11).[12]

@Link Networks	IP Communications
Cogent Communications	NorthPoint Communications
Covad Communications Company	Rhythms NetConnections
DSL.net, Inc.	Sphera Optical Networks, Inc.
GiantLoop Network Inc.	Yipes

Source: New Paradigm Resources Group, Inc.

Within this category, we included capital expenditure data from 15 DSL and 10 Gig-E/MAN providers, all of which are facilities-based CLECs. We have also thoroughly analyzed all eight of the CLEC-certified fiber layers, as well as the 17 carriers that pursued the BLEC model between 1999 and today.

Allied Riser Communications	EurekaGGN
Cypress Telecommunications Corporation	Everest Broadband Networks
e-link Communications	PhatPipe

Source: New Paradigm Resources Group, Inc.

[12] See NPRG's *Broadband Provider Report™, DSL Report™, Gig-E/MAN Report™, and BLEC Report™* for more about the carriers in this sub-category.

American Fiber Systems, Inc.	Looking Glass Networks
Cambrian Communications	Metromedia Fiber Network, Inc.
FiberNet Telecom Group, Inc.	NEON Optica, Inc.
Level 3 Communications	Parker Fibernet, L.L.C.

Source: New Paradigm Resources Group, Inc.

Table 12 provides the yearly totals for the DLEC and Fiber LEC sub-category.[13]

Year	1996	1997	1998	1999	2000	2001	Total (1996-2001)
Capital Expenditures	$0	$250	$583	$3,581	$6,144	$5,799	$16,357

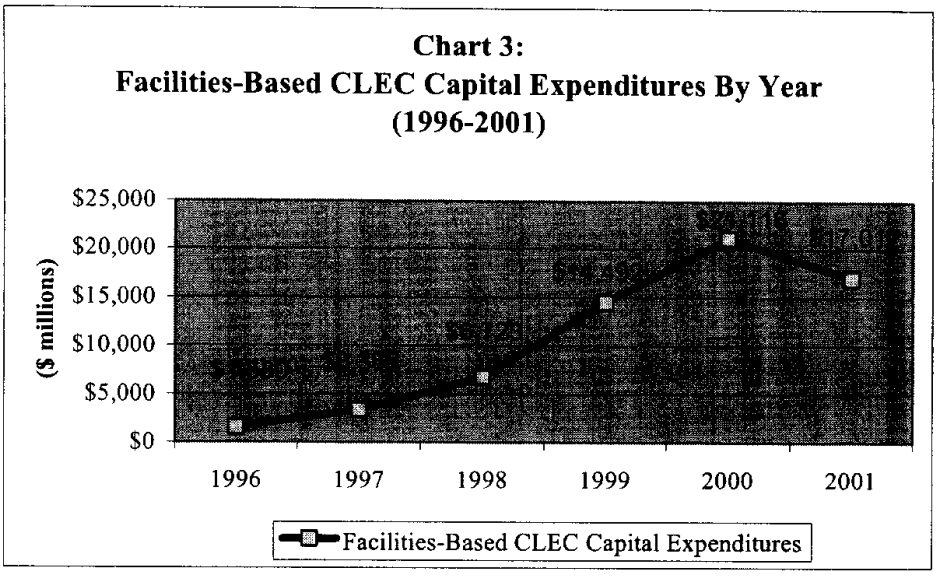
Source: New Paradigm Resources Group, Inc.

By adding up these four CLEC sub-categories we get $64.3 billion, the lower bound for our analysis of '96 Act-related capital spending (see Table 13 and Chart 3).

Year	1996	1997	1998	1999	2000	2001	Total (1996-2001)

Source: New Paradigm Resources Group, Inc.

[13] As a point of methodology, NPRG conducted its analysis to avoid double counting between this CLEC analysis and our long distance carrier analysis below. Thus, special consideration was given to carriers such as Level 3, which have both local and long distance spending components.



Source: New Paradigm Resources Group, Inc.

Utility Telecom Spending

Apart from the utility CLECs analyzed above, NPRG fully analyzed 35 utility telecom companies (see Table 14). In the course of conducting research on the dark fiber market, moreover, we assessed a wider array of utility-related communications operations.[14]

Our ongoing research illustrates that the motivation of these companies' utility parents to enter communications was a reaction to metro-area growth stemming out of CLEC growth—in other words, out of the '96 Act. We corroborated this point during our dark fiber research,[15] as well as during research into wholesale private line carriers.[16] NPRG sees these carriers' spending as a direct result of the '96 Act.

As with the facilities-based CLEC analysis above, we conducted capital expenditure analysis across all the companies and aggregated company totals.

[14] NPRG, *Assessment of Dark Fiber Providers*, January 2002 (78 Pages).

[15] *Ibid.*

[16] NPRG, *Wholesale Special Access: Markets, Competitors, Products and Trends*, September 2002 (681 pages).

Aerie Networks, Inc.	PECO*Adelphia* Communications
AFN Communications	Progress Telecom
C3 Networks	Seren Innovations
El Paso Global Networks	Sierra Pacific Communications
FPL FiberNet, LLC	Touch America
GPU Telecom Services, Inc.	Vectren Communications Services

Source: New Paradigm Resources Group, Inc.

Table 15 lays out the capital spending resulting from the analysis we conducted of this category.

	Total (1996-2001)

Source: New Paradigm Resources Group, Inc.

Additional IXC Capital Spending on Equipment Due to the '96 Act

For long-haul carrier capital spending on equipment, NPRG calculated an estimate attributable to the '96 Act.

IXC capital spending on equipment jumped dramatically in anticipation of larger amounts of voice and data coming out of the metro due to the '96 Act, as well as data increases stemming from the Internet expansion, itself spurred on by the effects of the new law. After the '96 Act, long-haul providers' spending was primarily on "fiber cable, high-speed SONET, and DWDM optical transport systems, digital cross connects, ATM switches/gateways and IP routers," equipment intended to increase their ability to deal with the increasing demand for bandwidth at the local exchange level.[17]

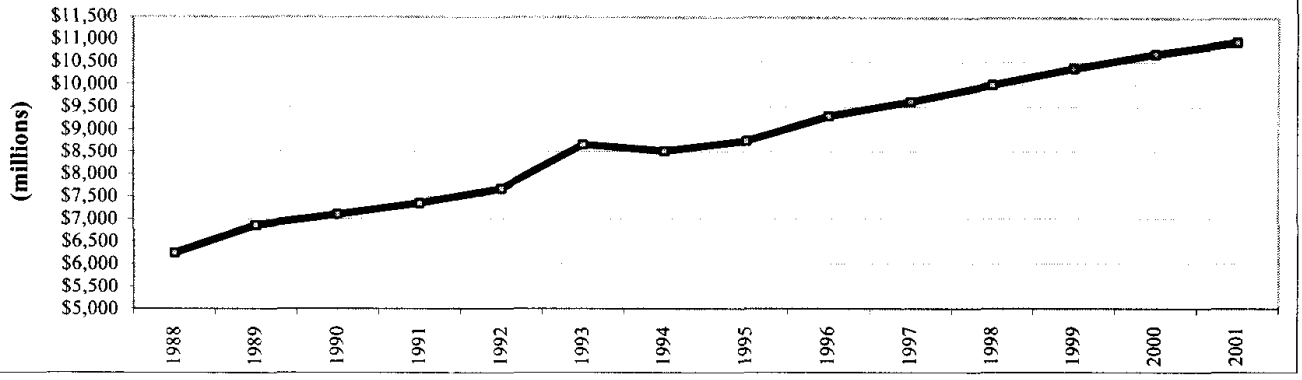
We began by setting out to find pre-1996 capital spending data. Based on a set of 1988-1995 central office (CO) equipment expenditure data,[18] we forecasted a post-1996

[17] Quote is from Skyline Marketing Group, *CapEx Report*™, First Quarter 1999. This view, however, is voiced across numerous other studies conducted during the period.

[18] TIA's Carrier Equipment Spending Charts, 1997-2002 *Telecommunications Market Review and Forecast* reports.

trend line to develop a picture of what equipment spending would look like in the absence of the '96 Act (see Chart 4). By comparing this "What if?" forecast with actual post-1996 spending, we calculated a percentage spread between actual and expected spending.

Chart 4:
Capital Spending on Central Office Equipment
(Post-1996 Trend Estimated without Effects of '96 Act)



We chose to apply this actual-over-expected calculation only to long-haul *equipment* spending. This minimized the possibility of capturing spending on new Operational Support Systems (OSS) and other purely operational improvements that carriers, like many companies during the 1990s, were drawn into by the IT boom.

NPRG also lowered the actual-over-expected percentage spread before applying it to the range of equipment beyond CO expenditures. The logic here is that these other forms of equipment spending might have been expected to grow more quickly post-1996 than CO equipment spending.[19]

The revised percentage spreads illustrated in Table 16 were then applied to the expected yearly equipment capital spending totals we developed.[20] Chart 5 illustrates actual expenditures relative to expected capital spending for the period. [21]

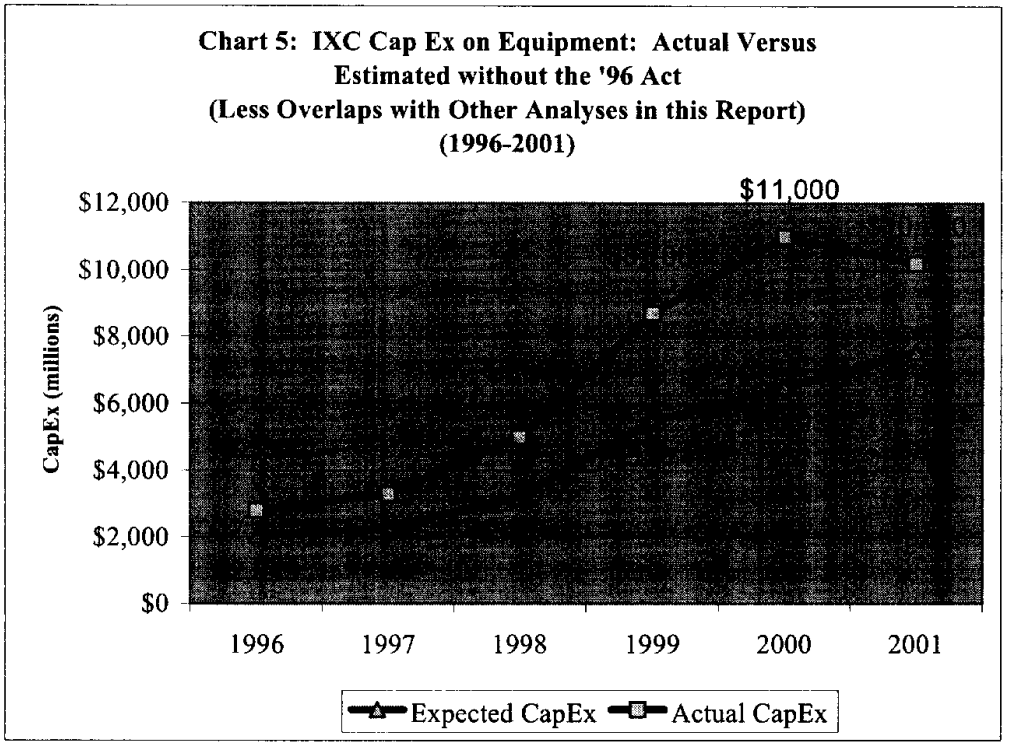
[19] A total of two basis points was shaved from the spreads for 1996-97, three from 1998-99, four from 2000, and two from 2001.

[20] TIA, *Telecommunications Market Review and Forecast 2002.*

[21] The totals were vetted for all overlapping between spending in this analysis and IXC capital expenditures related to CLEC operations and included in the CLEC analysis above.

Year	Spread
1996	37%
1997	45%
1998	56%
1999	59%
2000	69%
2001	34%

Source: New Paradigm Resources Group, Inc.



Source: New Paradigm Resources Group, Inc.

Table 17 breaks the final calculation down by year for the period 1996-2001, providing us with the surplus of IXC equipment capital spending attributable to affects of the '96 Act.

Year	Expected Equipment Capital Spending	Actual Equipment Capital Spending	Incremental Increase
1996	$2,045	$2,800	$755
1997	$2,276	$3,300	$1,024
1998	$3,204	$5,000	$1,796
1999	$5,474	$8,700	$3,226
2000	$6,493	$11,000	$4,507
2001	$7,557	$10,200	$2,643
TOTAL	[illegible]	[illegible]	[illegible]

Source: New Paradigm Resources Group, Inc.

Additional ILEC Capital Expenditures on Equipment Due to the '96 Act

It has not only been the IXCs that increased capital spending as a result of the '96 Act. The Incumbent Local Exchange Carriers (ILECs), including the Bell Operating Companies (BOCs) and Independent Operating Companies (IOCs), also increased their capital expenditures in response to the newly competitive environment.

The ILECs' portion of total wireline equipment spending fell from 76% to 66% between 1996 and 2001. The CLECs and IXCs boosted capital spending much more aggressively than the ILECs from 1996 to 1999. In 2000, however, the ILECs increased their capital expenditures on equipment by a massive 21%.[22] As they were forced past their fear of cannibalizing their dedicated access revenues by the growth in competitive DSL, they started pumping up their capital spending in response to what was clearly real competition in both the voice and data categories. This competition and the resulting capital spending increases were a direct effect of the '96 Act.

NPRG measured the ILECs' additional capital spending using largely the same techniques as applied to the IXCs above. Again, we applied the percentage spreads of actual over expected from Table 15, and pulled out capital spending that overlaps with other analyses. The calculations follow in Table 18.

[22] All previous statistics in this paragraph taken from TIA, *Telecommunications Market Review and Forecast 2002.*

Year	Expected Equipment Spending	Actual Equipment Spending	Incremental Increase
1996	$13,608	$18,636	$5,028
1997	$14,251	$20,659	$6,408
1998	$14,409	$22,486	$8,077
1999	$15,144	$24,070	$8,926
2000	$17,061	$28,903	$11,842
2001	$19,447	$26,249	$6,802

Source: New Paradigm Resources Group, Inc.

Effect on Cable Broadband Capital Spending

Cable's ongoing deployment of telephony service is a direct result of the '96 Act. We captured these cable capital expenditures related to telephony in the CLEC analysis above. It is also important to consider, however, certain other aspects of the cable industry's capital spending.

Cable's aggressive broadband deployment is another effect of the '96 Act. The reason we assert this is two-fold. First, the '96 Act created a core of aggressive competitors that appeared to be creating an alternate infrastructure to compete with the cable companies.[23] The introduction of competitors aggressively talking about convergence—and thus the potential for combined video, voice and data—forced cable operators into a faster rollout of broadband data services. Second, the competition that all sides began feeling as a result of more carriers pushed most players into marketing bundles of services. Again, this put pressure on the cable companies to aggressively deploy broadband as part of a wider package of goods to compete with other broadband industries.

To capture the amount of capital spending associated with cable's broadband rollout, we began by calculating the number of cable broadband subscribers passed, using the latest available figures (see Table 19).

[23] The development of broadband infrastructures generally, but IP and other packetized services specifically, suggested the convergence of video, voice, and data.

Our next step was to determine how much capital, per subscriber, was expended to deploy cable broadband. This data was uncovered in investment banking analyses of the industry. [24]

TOTAL	9,200,000

Source: National Cable & Telecommunications Association

Table 20 provides a breakdown of subscribers, capital spending per subscriber, and the resulting cable broadband capital expenditure total.[25]

Total Subscribers	9,200,000
Capital Expenditures per Subscriber	$2,000

Source: New Paradigm Resources Group, Inc.

Categories Not Included in this Report

The conclusions of this survey are also notable for the capital expenditure numbers not included:

- First, we decided not to include the capital spending of vendors, opting to include only carrier spending.

- Second, we did not include mobile wireless providers. The dynamics of this industry are different from wireline, and while their capital spending might in part have been affected by the '96 Act, this would be very difficult to measure.

[24] The range used was $2,100 to $2,650 in net present value (NPV) capital spending per residential broadband subscriber, which we rounded down to $2,000. The final range comes from First Union Securities, *Residential Broadband Carrier Industry*, September 2000, p. 17.

[25] By multiplying the $2,000 amount by Table 18's 9.2 million-subscriber total, we are left with a total of $18.4 billion in capital spending for broadband deployment. Because this calculation only included present subscribers—and not households passed—coupled with the fact that capital spending per head would be higher in the beginning of a rollout (until the total is distributed across a larger, terminal number of subscribers), this is a low-end calculation of '96 Act-related spending.

- Third, we did not include cable industry capital spending beyond that associated with telephony and broadband deployment. This is, however, an important category, one that merits analysis to better determine the connection between its capital spending totals and the '96 Act.

Conclusion

Table 21 illustrates the aggregation of totals developed across our CLEC, Utility, IXC, ILEC, and cable industry analyses. It represents a massive 28% of all communications capital spending during the period ($530 billion from Table 1).[26] This means that '96 Act-related capital spending added almost 2% to overall U.S. capital expenditures for the period, a material amount.

Carrier Category	Total Capital Expenditures
Voice-Focused CLECs	$44,451
IOC-Owned CLECs	$1,416
Utility Telecom CLECs	$2,072
DLEC & Fiber LEC	$16,357
Utility Telecoms	$6,600
Additional IXC Capital Spending on Equipment Due to the '96 Act	$13,951
Additional ILEC Capital Spending on Equipment Due to the '96 Act	$47,083
Cable Broadband	$18,400

This total amounts to more than $520 for every man, woman and child in the country. Moreover, this capital spending reflects a significant investment in our nation's telecommunications infrastructure, which will contribute to tomorrow's economic growth.

[26] This represents all communications spending, including wireline, wireless, and cable.

ATTACHMENT 4

Transport Competition and Circuit Grooming

CC Docket Nos. 01-338, 96-98, 98-147

WorldCom, Inc.

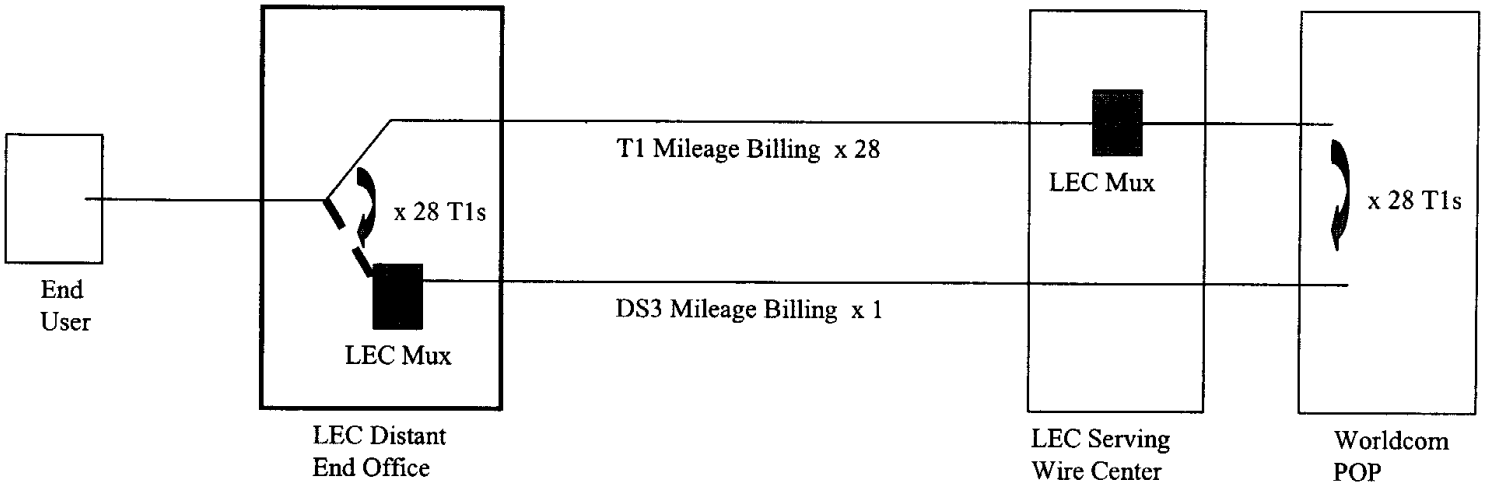
September 30, 2002

Local Transport Networks

- ILEC interoffice facilities
  - Connect end user wire centers with WorldCom serving wire centers where WorldCom self-provides or purchases entrance facilities.
  - Thus allow WorldCom to provide end users with a host of voice and data services.
- WorldCom fiber-based collocations
  - Allow WorldCom to eliminate ILEC interoffice facilities that connect particular wire centers to the wire center where WorldCom would otherwise obtain entrance.
  - Do not replace ILEC facilities between the collo site and other wire centers where WorldCom does not have facilities, but does have customers.

ILEC IOF Optimization

Elimination Of T1-Billed Mileage

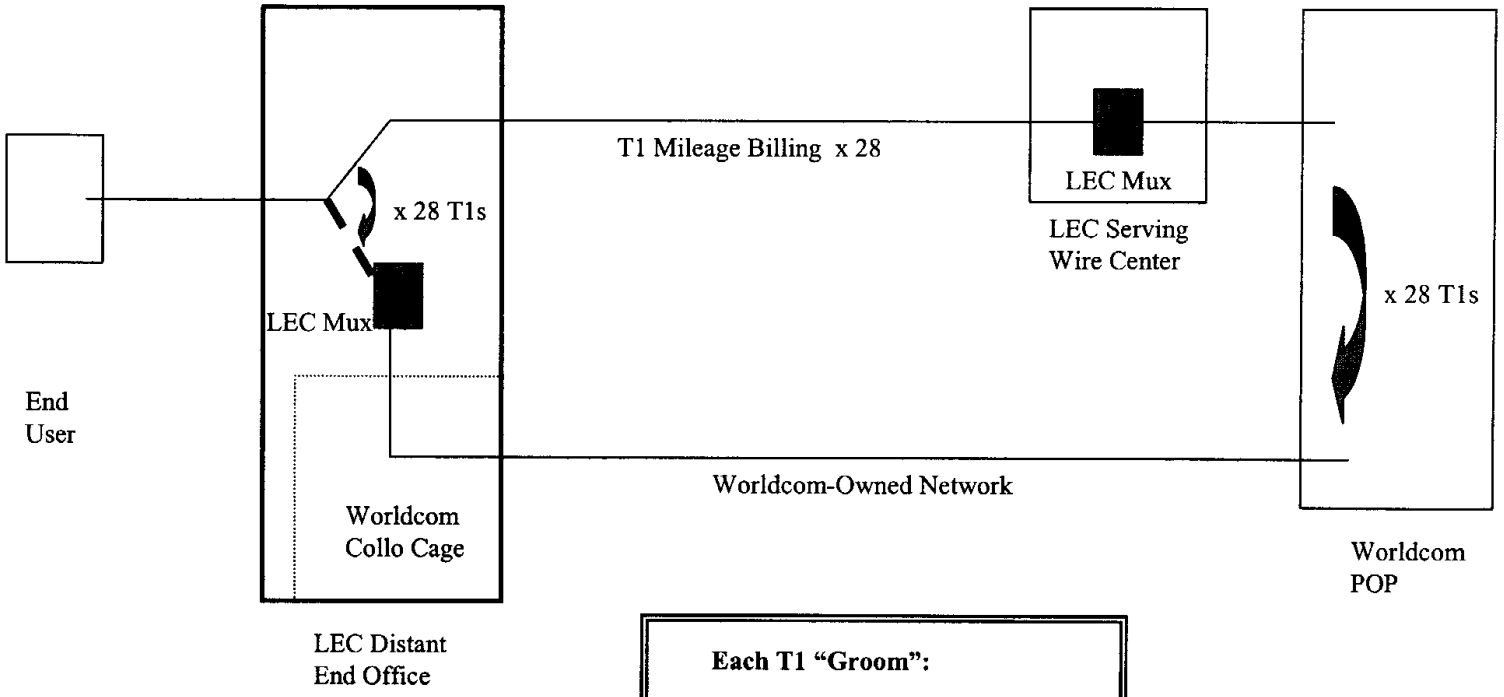


Each T1 "Groom":

- Replaces T1 inter-office fixed/variable transport charges with one DS3 charge.
- Breakeven: 8-10 T1s
- *Incurs One-Time Fee Paid to LEC*
- Typical Savings: $175-225 Per T1, After Cost of Interoffice DS3

ILEC IOF Optimization

Fiber-Based (Collocation)



Each T1 "Groom":

- Eliminates IOF Fixed Mileage
- Eliminates IOF Variable Mileage
- *Incurs One-Time Fee Paid to LEC*
- Typical Savings: $250-325 Per T1, (No LEC DS3 Required)

Overview of Grooming Process

- Preparation
  - WorldCom orders new DS3 from LEC
  - WorldCom submits "groom" orders
  - ILEC schedules cutover date
  - Worldcom notifies customer of planned change
- Implementation
  - ILEC and WorldCom Operations coordinate via phone
  - Technicians test new path
  - Parties simultaneously patch circuit to new path
  - Customer end loop not affected (reused)
- Post-Conversion
  - ILEC and WorldCom deactivate original path
  - ILEC bills WorldCom one-time charge to cover labor

Circuit Migrations Critical

- Annual Domestic Access Bill: $7B+
- Once WorldCom collocates, critically important that circuits on ILEC interoffice facilities are "groomed" onto newly extended WorldCom fiber.
  - Otherwise, WorldCom does not obtain the benefit of its investment (Over $100M June 2002 – Sept 2003)
  - Future Investment Discouraged
- Circuit grooms require the cooperation of the ILEC (which has a powerful incentive not to cooperate).

Grooming Performance of SBC and Verizon is Woeful

- SBC and Verizon have placed unreasonable limits on the number of circuits they will groom.
  - In Ameritech region, SBC will perform only 600 grooms/month. Verizon will perform only 700/month throughout Verizon East.
  - Result is a significant backlog of ungroomed circuits for which WorldCom continues to pay ILEC access charges. (Approximately 40 months of backlog for SBC; approximately 38 months for Verizon.)
  - Worldcom is blocked from realizing return on investment
  - Problem will only get worse if WorldCom expands its network. As a result, WorldCom is considering a significant reduction in the number of additional collocations planned for this year.

Remedy

- Arbitrary limits imposed by SBC and Verizon are poisonous to transport competition.
- SBC and Verizon must agree to groom at least 2200 circuits/month.
  - Other ILECs perform at roughly this level.
- SBC and Verizon should provide bill credits for circuits that are not groomed by the requested date.
  - Such a policy would better align ILEC incentives with the Commission's goal of facilities-based competition.

Conclusion

- Competitive transport networks are capable of providing an alternative to some, but not all ILEC interoffice facilities in metropolitan areas.
- The success of transport competition depends critically on ILEC cooperation with competitors. SBC and Verizon are thwarting, not facilitating, transport competition.

ATTACHMENT 5

CompTel/ASCENT

July 9, 2004

The Honorable Michael K. Powell
Chairman
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: *Interim Local Competition Rules, CC Docket Nos. 01-338, 96-98 and 98-147*

Dear Chairman Powell:

CompTel/ASCENT ("CompTel") wishes to supplement our June 24th Motion for an Emergency Stabilization Order with a more detailed discussion of why it is appropriate for the Commission to adopt interim rules that require incumbent LECs to continue to provide cost-based access to vacated unbundled network elements "UNEs" pending the adoption of final rules.[1] In our Motion, we stressed the importance of maintaining cost-based access to all of the high-capacity transmission UNEs, including dark fiber and DS1/DS3 loops and transport. The massive sunk investment incurred by carriers dependent on these UNEs magnifies the potential negative consequences of a premature and significant cost increase for these critical inputs.

However, in this letter, we wish to specifically focus on the importance of preserving access to DS1 loops and DS1 enhanced extended loops ("EELs") as UNEs pending the adoption of final rules. All five Commissioners previously supported the continued availability of cost-based access to DS1 loops because of the overwhelming evidence of impairment. We fully expect that the Commission will once again find impairment because, as the found in the *TRO*, it is economically infeasible to provide service to small businesses without access to DS1 facilities.

Despite the clear evidence of impairment that the Commission has before it, we understand that the Commission may have under consideration interim rules that would result in an automatic price increase for DS1 loops and DS1 EELs. The price increase would go into effect in six months regardless of whether the Commission issues final

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[1] *Motion of CompTel/ASCENT for Emergency Stabilization Order and supporting Declaration of M/C Venture Partners*, CC Docket No. 01-338, filed June 24, 2004.

UNE rules within that time frame. Specifically, we understand that the Commission may impose an automatic 15% price increase for existing DS1 loops and DS1 EELs. Even more troubling, is the possibility that prices for new DS1 loops and EELs would increase to special access rates at that time. The result of such an interim rule would be that, at year-end, carriers that are clearly impaired would nonetheless lose cost-based access to these network elements should the Commission not have completed final rules.

The consequences would be devastating, not only for facilities-based competitive carriers[2], but also for the thousands of small business customers that these carriers serve with DS1 loops and EELs. A recent economic study found that having to replace DS1 UNE loops and EELs with special access services would increase carrier costs by more than 100% on average, and, as a result, would cost small businesses $4.9 billion annually.[3/] As that study concluded, "[e]limination of UNE DS1 loops and transport would deal a staggering blow to nascent facilities-based competition, crippling the competitive carriers who supply DS-1 services to small and medium-sized businesses." A copy of the study is attached.

The Record Before the Commission Shows that Facilities-Based Carriers Are Impaired in their Ability to Serve Small Business Customers Without Access to DS1 Loops

One area where facilities-based carriers have enjoyed success in competing against the incumbent carriers is in the small and medium size segment of the enterprise market. The continuing ability of carriers to bring competitive choice to this market segment is, however, critically dependent on unbundled access to incumbent LEC DS1 loops and EELs. The Commission clearly recognized in the TRO the vital importance of continuing access to DS1 loops when serving small business customers:

> The record indicates that many competitive carriers providing DS1 capacity loops to enterprise market customers serve the small to medium-sized segment of this market which is characterized as typically underserved by incumbent LECs. Indeed, many of these competitive LECs, which are themselves small to medium size businesses, have entered the competitive telecommunications market specifically to serve these smaller business customers requiring primarily DS1 level capacity. The DS1 loop unbundling rules we adopt today recognizes the dependency that smaller business customers and carriers have on DS1 capacity loops and accommodates those needs consistent with our impairment framework. *Triennial Review Order*, n. 961.

The TRO proceeding produced overwhelming evidence that carriers are impaired in serving this market segment without access to DS1 loops. As stated by the

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[2] Recently, CompTel described, in detail, the consequences for competitive carriers that would result from significant near term price increases for critical inputs. See *Motion of CompTel/ASCENT for Emergency Stabilization Order and supporting Declaration of M/C Venture Partners*, CC Docket No. 01-338, filed June 24, 2004.

[3/] The Economic Impact of the Elimination of DS-1 Loops and Transport as Unbundled Network Elements, Microeconomic Consulting and Research Associates, Inc. (MiCRA), June 29, 2004. The study was performed for CompTel/ASCENT and Nuvox Communications.

Commission, "[t]he record shows that requesting carriers seeking to serve DS1 enterprise customers face extremely high economic and operational barriers in deploying DS1 loops to serve these customers." *Triennial Review Order,* ¶ 325. The impairment finding, supported by all five Commissioners, was predicated on the economic characteristics of the small business customers served by these facilities. Specifically, the Commission found that the "much lower revenue opportunities" available from selling services to smaller businesses, coupled with higher customer churn, "make it *economically infeasible* for competitive LECs to self-deploy DS1 loops, which require the same significant sunk and fixed costs of higher capacity loops." *Triennial Review Order* ¶ 325 (emphasis added).[4/] There simply was no evidence in the record that any carrier was or could self-deploy DS1 level loops. Indeed, because the record so overwhelmingly demonstrated that carriers cannot economically self-deploy at the DS1 level, the Commission did not even bother to delegate to the states the authority to determine DS1 loop impairment based on the self-provisioning trigger. *Id. at* ¶ 327. The Commission also found "scant evidence" of wholesale alternatives for DS1 loops.[5/] Even the ILECs recognized impairment at the DS1 capacity level. *Id.* at ¶ 325, n. 960.

The same conclusions apply when DS1 loops are combined with DS1 transport to create the DS1 EEL. When used as part of a DS1 EEL, DS1 transport merely extends the reach of the loop. DS1 transport used in this way does not aggregate traffic from multiple customers. Instead, the DS1 EEL effectively provides dial tone for a single customer, and the carrier's ability to recoup the costs of the EEL depends solely on the revenue from the single customer served by that EEL. Thus, DS1 transport when used to extend the reach of a DS1 loop shares the economic characteristics of that loop and carriers are equally impaired without access to DS1 EELs as they are without access to stand-alone DS1 loops.

In the TRO, the Commission specifically recognized the vital importance that access to EELs plays in fostering facilities-based competition and innovation, "[b]ased on the record before us, we conclude that EELs facilitate the growth of facilities-based competition in the local market." *Triennial Review Order,* ¶ 576. EELs allow carriers economically to serve many more customers and promote "self-deployment of interoffice transport facilities." *Id.* The Commission also found that EELs promote innovation "because competitive LECs can provide advanced switching capabilities." *Id.*

Requiring Carriers to Utilize Special Access Services Harms Facility-Based Carriers and Their Small Business Customers

Depriving facilities-based carriers of continued access to DS1 loops and EELs would not only harm those carriers, but their small business customers as well. CompTel and member NuVox Communications recently requested Microeconomic Consulting and

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4/ The Commission found that "revenues generated from small and medium enterprise customers are not sufficient to make self-deploying DS1 loops economically feasible from a cost-recovery perspective. . . . Competitive carriers do not have the ability to recover sunk costs in self-deploying DS1 loops." TRO ¶ 326

5/ None of this analysis was challenged by the court in *USTA II.*

Research Associates, Inc. (MiCRA) to measure the impact on small and medium-sized businesses if DS1 loops and DS1 transport were no longer available at cost-based rates. The study found that replacing DS1 loops and EELs with special access would increase carrier costs by more than 100% on average. In some states costs would increase ten-fold. Cost increases of this magnitude invariably would lead to increase costs to small business consumers, resulting in a cost to small and medium-size business customers of approximately $4.9 billion annually.

Moreover, in sharp contrast to EELs, which the Commission found promote self-deployment of transport and facilities-based competition in general, requiring carriers to utilize tariffed special access services undermines facilities-based competition. Special access tariffed pricing is predicated on volume and term commitments that have the effect of locking carriers onto the incumbent LECs' network. Once locked into a term and volume plan, carriers cannot move traffic onto self-deployed or third party networks without incurring termination penalties. These penalties make it uneconomic to utilize alternatives to the ILECs' network.

The Commission Should Ensure Continued Access to DS1 Loops and EELs Pending Final Rules

There is an exceedingly strong likelihood that the Commission will once again find carriers are impaired without access to DS1 loops and DS1 EELs when it issues its final rules, and such a finding would be fully consistent with *USTA II*. The Chairman has announced that he hopes to have those rules in place by the end of the year. It is our intent to render whatever assistance possible to ensure the timely completion of new rules. The Commission should not, however, adopt interim rules that would automatically impose non-cost based rates on carriers if the Commission cannot, despite its best intentions, complete final rules by the end of year. To do so would be to impose cost increases on carriers that, in the vast majority of cases, if not all cases, are impaired without access to DS1 loops and EELs.[6/]

Sincerely,

H. Russell Frisby, Jr.
CEO

cc: Commissioner Kathleen Q. Abernathy
Commissioner Kevin J. Martin

6/ Finally, any concern that continued access to DS1 loops and EELs might result in UNE access in a few instances where a carrier is not impaired is more than adequately addressed by capping access to any single customer location at 2 DS3s, as provided by the *TRO*.

cc (cont'd): Commissioner Michael J. Copps
Commissioner Jonathan S. Adelstein
Michael D. Gallagher
Christopher Libertelli
Matthew Brill
Daniel Gonzalez
Jessica Rosenworcel
Scott Bergmann

The Economic Impact of the Elimination of DS-1 Loops and Transport as Unbundled Network Elements

MiCRA

Microeconomic Consulting & Research Associates, Inc.

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June 29, 2004

Executive Summary

A study was conducted to measure the economic impact on small and medium-sized businesses if DS-1 loops and interoffice transport were no longer available as unbundled network elements due to state or federal regulatory action, and CLECs were forced to pay ILECs' Special Access tariffs to continue to provide service to this market segment. The study considers the current prices charged by CLECs and ILECs for DS-1 based services, the likely price response by CLECs and ILECs if wholesale costs increased to Special Access rates, and changes in customer demand for DS-1 services due to these pricing responses.

DS-1 services are provided by CLECs to small and medium-sized businesses. These services offer significant advantages to such firms, because of the ability to combine voice and high-speed data services over a single facility. DS-1 services are the backbone of the business of facilities-based competitive carriers – those carriers that invest in their own switching facilities and combine their switching and other service functions with ILEC-provided loops.

If unbundled DS-1 loops and transport were unavailable, CLECs would be forced to obtain access to these essential functions under the terms of the ILECs' Special Access tariffs. Although the loop and transport functions provided under these tariffs are functionally equivalent to those provided today as unbundled network elements, the rates charged for Special Access services are substantially higher than those charged for unbundled network elements.

A dominant firm-competitive fringe model was used to estimate the change in equilibrium price resulting from the imposition of substantial cost increases on CLECs. The model used the best publicly-available information regarding the size of the market for DS-1 services, ILEC and CLEC relative market share in that market, current prevailing market prices for integrated DS-1 voice and data services, and current rates for unbundled network elements and Special Access services.

The model results show that:

- The gross annual cost impact to CLECs of a transition from DS-1 UNE loops and transport to equivalent Special Access services is $2 billion. This represents more than a 100% cost increase on average to the CLECs. In some states these costs increase up to tenfold.

- The price to business customers of DS-1 services would increase by 25%.

- The overall decrease in consumer welfare would amount to $4.9 billion annually.

Elimination of the availability of DS-1 unbundled loops and transport would impose substantial costs on small and medium-sized business, both in absolute price increases for DS-1 telecommunications services, and in the loss of the advantages associated with those services. The continued viability of facilities-based local exchange competition also could be threatened, as the reduction in market share that would be experienced by CLECs would render large fixed investments in switches and associated facilities uneconomic.

I. Introduction

An economic study was conducted to estimate the effects on consumer welfare of the elimination of the availability of unbundled DS-1 loops and transport to competitive local exchange carriers (CLECs).

The DS-1 transmission rate is defined as a digital signal with a bandwidth of 1.544 Mbps in both directions, capable of transporting data (*e.g.*, Internet communications or virtual private network channels) or voice signals, or a combination of the two. If used exclusively for voice, a DS-1 channel can accommodate up to 24 voice-grade channels. DS-1 services traditionally have been provided using a four-wire loop connecting a customer's premises with a local exchange carrier wire center. A DS-1 channel unit at the customer's premises is used to combine voice channels and data signals into the DS-1 signal format, and a similar unit at the wire center can again separate the combined signal into individual voice and data channels, or alternatively, the DS-1 signal can be cross-connected to interoffice transport facilities to be carried to another local wire center or to the interexchange network.

In providing telecommunications services to customers, CLECs have used DS-1 facilities provided by incumbent local exchange carriers (ILECs) in combination with facilities provided by the CLEC or by other communications service providers to offer business customers switched voice services and data services. ILEC facilities used in providing such services have, since the adoption of rules by the FCC pursuant to the Telecommunications Act of 1996, been available as unbundled network elements ("UNEs") under negotiated or arbitrated interconnection agreements, under state tariffs, or subject to a Statement of Generally Available Terms ("SGAT").[1] DS-1 loops and transport also are available to CLECs under the terms of the ILECs' Special Access tariffs, generally at much higher prices than those that prevail for the use of identical facilities as unbundled network elements.[2] In its Triennial Review Order of 2003, the FCC found that DS-1 loops and transport should continue to be made available by ILECs as unbundled network elements, subject to individual state determinations of the degree to which CLECs were impaired without access to these elements.

While the DS-1 signal format can accommodate up to 24 voice grade channels, use of this service does not require that a business customer have a requirement for as many as 24 voice grade lines. Indeed, as the growth of the Internet has increased the demand on the part of business customers for digital bandwidth, smaller businesses have

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[1] The CLECs have experienced significant problems with the ordering and provisioning practices of the ILECs, especially for UNEs.

[2] Some CLECs have continued to be forced to order Special Access, in spite of the lower prices charged for UNEs, because of these problems. See, *e.g.*, Press Release, *Time Warner Telecom Not Impacted By UNE Ruling* (June 10, 2004) ("In those instances where we need services from ILECs to connect our remote customers to our vast fiber network, we purchase those under Special Access tariffs . . ..") It is important to note, though, that carriers who do use ILEC special access are likely using it as a transitional mechanism and are primarily focused on larger customers, and are not focused on the small business market like the CLECs who are currently using DS1 UNE Loops and Transport. See also, Time Warner Telecom, Inc., SEC Form 10-Q, May 10, 2004 ("We operate in 44 metropolitan markets that have high concentrations of medium- and large-sized businesses.")

found that the use of integrated DS-1 services, combining both voice and data traffic, is economically attractive. Businesses using DS-1 services constitute an important segment of the local telecommunications market, occupying a "middle ground" between the mass market customer and larger business customers that are more economically served using DS-3 services.

The purpose of this study is to measure the economic impact on small and medium-sized businesses if DS-1 loops and interoffice transport were no longer available as unbundled network elements due to state or federal regulatory action, and CLECs were forced to substitute services obtained under the ILECs' Special Access tariffs to continue to provide service to this market segment. The study considers the current prices charged by CLECs and ILECs for DS-1 based services, the likely price response by CLECs and ILECs to the change in cost inputs to the CLECs, and changes in customer demand for DS-1 services due to these pricing responses.

II. Background

The Telecommunications Act of 1996 defines three modes of entry to competitive local exchange carriers. These are resale of existing ILEC local service offerings, use of combinations of unbundled network elements provided by ILECs to CLECs, and full or partial facilities-based entry.

Resale of existing ILEC local exchange services is available to CLECs at prices established by state public utilities commissions. These prices are required, under FCC rules, to be set at a discount from the ILEC's retail prices, the discount being equal to the costs avoided by the ILEC by not providing the service at retail. In general, this entry option has not been an attractive one for CLECs. The wholesale prices established have not permitted CLECs, given the ILEC's retail rates, to set their retail prices in such a way as to recover their own costs of doing business. Resold lines constitute only 11% of all lines provided by ILECs to CLECs, and resale as a mode of entry has been steadily declining since 2000.[3]

CLECs also have the option of using unbundled network elements, individually or in combination, to provide local exchange service. Where the CLEC purchases a combination of UNE loops, switching, and transport, combining these elements with other service elements provided by the CLEC, this mode of entry is known as "UNE-P" for UNE platform. Under FCC rules, prices for unbundled network elements are to be set according to the forward looking Total Element Long-Run Incremental Cost ("TELRIC"), a costing standard designed to simulate the costs that could be recovered by an efficient carrier operating a local exchange network in a competitive marketplace. Prices for CLEC use of unbundled network elements have been established by state public utility commissions by their approval of negotiated interconnection agreements, by their arbitration of such agreements, or through adjudicated proceedings.

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[3] FCC Local Competition Report, December 2003, Table 4.

UNE-P has been the primary mode of entry for CLECs serving mass market residential and business customers, and has steadily increased as a proportion of all CLEC lines in the last five years, now accounting for 67% of all CLEC lines.[4] The economic pricing of UNE-P, together with the ability of CLECs to differentiate their product offerings with value-added services such as voice mail and "follow-me" features have resulted in the rapid expansion in mass-market local exchange competition. There is evidence that the availability of the UNE platform has permitted some CLECs to achieve sufficient customer volume to justify CLEC investment in switching, transport and collocation facilities in certain locations to permit transition from UNE-P to facilities-based service provision.

Full or partial facilities-based entry involves CLEC provision of one or more network functions, frequently in combination with one or more ILEC unbundled network elements. Most frequently, the CLEC provides the local switching function in conjunction with ILEC unbundled loops and transport. In some instances where a sufficiently large number of customers are concentrated, *i.e.*, in a large office building or office park, the CLEC may provide all local exchange functions, including loop and transport facilities, but CLECs continue to require unbundled loops and transport to reach the vast majority of customer locations.

Those carriers that have entered the local exchange market using their own switching facilities primarily use those facilities to serve customers requiring DS-1 services or services using higher-bandwidth lines. In its Triennial Review Order, the FCC cited evidence that 90% of the lines served from CLEC switches were at the DS-1 level or higher.[5]

For business customers requiring more than a few lines, DS-1 service is increasingly an attractive option. With the increasing importance of the Internet to businesses in all industries, the ability of integrated DS-1 services to carry both voice and data traffic on a single facility permits both higher-speed access to the Internet and cost savings relative to the use of analog services. Smaller businesses have taken advantage of CLEC offerings to migrate from ILEC-provided voice grade lines to CLEC integrated voice and data services. A recent study commissioned by the Small Business Administration found that about one quarter of small businesses are served by CLECs.[6]

As noted earlier, unbundled network elements are required by FCC rules to be priced to recover the economic costs incurred by the ILECs in the provision of those network elements. Under the FCC's TELRIC costing methodology, these economic costs represent the costs that would be incurred by an efficient firm providing local exchange service in a competitive market. While DS-1 Special Access services use identical network components and service configurations as UNE-based DS-1 services, rates for Special Access are established according to an entirely different standard. Special Access rates initially were based on the ILECs' reported cost of service as assigned to Special

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4 *Id.*

5 TRO ¶437.

6 Pociask, Stephen B. "A Survey of Small Businesses' Telecommunication Use and Spending." SBA Office of Advocacy, March 2004, p. 67.

Access services through an arcane set of regulations that included both arbitrary allocations and substantial cross-subsidies among ILEC services. As such, they bear little relationship to economic cost. Rather, they reflect the costs incurred under a monopoly regime, where ILECs were permitted to earn a fixed rate of return on investment after recovery of operating expenses. Furthermore, since price caps were implemented, the ILECs have been granted complete pricing flexibility for Special Access services when they have been able to demonstrate a degree of competitive provision of Special Access services in part of their territory. This pricing flexibility means that the ILECs Special Access prices for the most part no longer face any regulatory constraint. Indeed, a recent study concluded that the rate of return on invested capital earned by the RBOCs on Special Access services is almost 40%.[7]

Consequently, the rates for DS-1 Special Access service are, in general, substantially greater than similar services available from the ILECs as unbundled network elements. In particular Special Access rates contain substantially higher charges for transport mileage between ILEC wire centers, and for termination of transport facilities in ILEC wire centers. Loop rates also are much higher under Special Access tariffs than the equivalent rates for unbundled network elements.

If access to DS-1 loop and transport UNEs were to be eliminated due to FCC action, CLECs using these UNEs would be forced to confront an immediate decision: either to substitute services obtained under the Special Access tariffs for DS-1 UNEs or to exit the market for provision of services based on these UNEs. It is important to note, however, that the end result of either "decision" is for the CLEC to exit the small business market.

Use of services obtained under the Special Access tariffs would impose substantial cost increases on CLECs.[8] CLECs would be forced to increase their retail rates to recover the additional costs, thus imposing the cost increases on the small and medium-sized business customers that rely on CLEC services. ILECs can be expected to adjust their prices in response to CLEC price increases. CLEC customers in turn can be expected to adjust the amount of DS-1 services that they purchase in view of the higher rates, or to decide to obtain service from the ILEC instead, or both. The effect of these market adjustments is expected to be an overall reduction in consumer welfare. This reduction may be measured directly in the higher costs that will be imposed on small and medium-sized business customers, and the loss of utility from the diminished demand for

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[7] Rappaport, Paul N., Lester D. Taylor, Arthur S. Menko, Thomas L. Brand. "Macroeconomic Benefits from a Reduction in Special Access Pricing." June 12, 2003. p. 4.

[8] It is these cost increases that, in themselves, will have devastating financial impacts on the CLECs. Due to the significant debt component of the typical CLEC's capital structure, the likelihood is that a price increase for a key input, of the magnitude being considered, will cause an immediate disruption of the CLEC's access to capital through the triggering of debt covenants. See, *e.g.*, Declaration of M/C Venture Partners filed in support of the Emergency Motion of CompTel/ASCENT, CC Docket Nos. 01-338, 96-98, 98-147, June 24, 2004, ¶¶ 7-11. However, because the purpose of this study is to focus on the *consumer effects* of an input price increase, readers should refer to the referenced Declaration for a more detailed discussion of the effects on the CLECs from such a price increase.

telecommunications services. It is the purpose of this study to estimate these additional costs.

III. Methodology

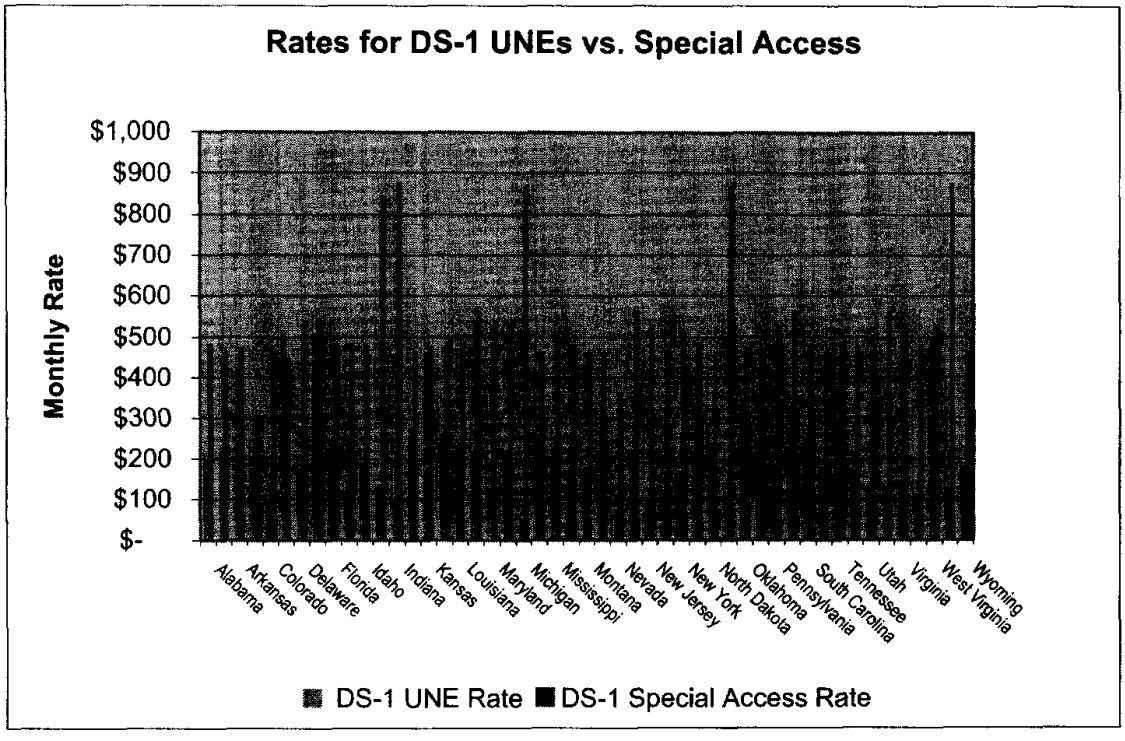
The study assumes that the availability of DS-1 UNE loops and transport has been eliminated, and that CLECs are forced to substitute equivalent services obtained under Special Access tariffs for DS-1 UNEs.

Cost Impact to CLECs

To measure the direct cost impact on CLECs, data first were gathered from ILEC approved interconnection agreements, Statements of Generally Available Terms ("SGATs"), and state tariffs on the rates for unbundled DS-1 loops and unbundled DS-1 dedicated transport. Where DS-1 Enhanced Extended Loops ("EELs") were offered in a particular state, those rates were used. Where EELs were not offered, rates for unbundled DS-1 loops and unbundled dedicated transport were used instead. The study did not consider the non-recurring costs associated with the use of these UNEs, although these costs are substantial, and may affect unit costs significantly, particularly where high customer churn is a factor. An average transport distance of fifteen miles from the customer's serving wire center to the CLEC's serving wire center was assumed. This distance is frequently used in analyses performed to investigate costing, pricing and profitability issues in this market. The highest density zone rate (generally the lowest available rate) was assumed in all cases. The cost of entrance facilities (the connection from the wire center serving the CLEC to the CLEC's network) was disregarded, because these facilities are often self-provided by CLECs, and are a small portion of total costs anyway.

Special Access rates were obtained from each RBOC's current interstate Special Access Tariffs. As with UNE rates, non-recurring charges and the cost of the entrance facility were disregarded. The same fifteen mile average transport distance was assumed for Special Access. Although some Special Access tariffs provide for discounted rates if term contracts are accepted by the CLEC, the month-to-month rate was used for purposes of this study. This is appropriate because these rates are the most directly comparable to UNE rates (for which term discounts generally are not offered).

Figure 1



Nationwide the weighted average monthly cost increase to CLECs of migration to Special Access is $355 per DS-1 line. In many states, the disparity between UNE and Special Access rates is much greater – in some states, Special Access rates are as much as ten times higher. Figure 1 illustrates the difference between UNE rates and Special Access rates by state. Special Access rates are, on average, more than twice the rate charged for the equivalent UNE loop and transport services.

Size of Market for DS-1 Services

Perhaps the greatest challenge in performing this study was estimating the size of the market for DS-1 services. Little publicly-available information is available on the number of DS-1 services provided either by ILECs or CLECs. Existing FCC reporting mechanisms generally require reporting service volumes in terms of voice-grade equivalents – that is, the total equivalent number of 4KHz analog circuits or 64Kbps digital circuits provided by carriers, regardless of the service configurations in which these circuits are provided.

One RBOC – BellSouth – reports the number of DS-1 services that it provides within its operating territory as a part of its annual report to shareholders. To estimate the number of DS-1 services provided by each RBOC, the ratio of BellSouth's reported DS-1 services to the total number of voice grade equivalent circuits was applied to the voice grade equivalent circuits reported by each RBOC.

CLEC DS-1 services were estimated by using data reported by the FCC on CLEC market share. The FCC reports market share estimates based on voice grade equivalent channels reported by ILECs and CLECs, respectively. These estimates are reported separately for residential/small business customers (including business customers with three or fewer lines) and for "other" customers (all customers not included in the residential/small business) category. The market share figure of 23.2% for the "other" category was used in this study, as it is likely more representative of CLEC market share penetration for DS-1 services than the residential/small business market share figure. It is also consistent with the results of the Small Business Administration study cited earlier.

Table 1 presents the estimated number of DS-1 services provided by CLECs and ILECs. The nationwide market for DS-1 services is estimated at slightly over two million DS-1 services.

Table 1
Size of the DS-1 Market

	ILEC DS-1 Services	CLEC DS-1 Services	Total DS-1 Services
BellSouth	276,686	83,379	360,064
Qwest	191,796	57,797	249,594
SBC	602,063	181,431	783,494
Verizon	479,036	144,357	623,393
	1,549,581	466,964	2,016,545

Market Price for DS-1 Services

Efforts to estimate the average market price for DS-1 services also suffer from a paucity of published information on the actual rates charged for the telecommunications services purchased by small and medium-sized business. While the FCC gathers and publishes information on average rates, its data collection activities are focused on rates for residential consumers. Information available from sources such as the U.S. Bureau of the Census and the Small Business Administration generally is insufficiently granular to permit an estimate of the prices charged for particular services.

A recent study by the Small Business Administration,[9] however, does provide one estimate of the rates charged to small businesses for DS-1 and other telecommunications services. That study found that unit monthly expenditures for DS-1 service for firms responding to the survey were, on average, $559.61.[10] Expenditures for DS-1 service

[9] Pociask, Stephen B. "A Survey of Small Businesses' Telecommunication Use and Spending." SBA Office of Advocacy, March 2004.
[10] *Id.*, Figure 31.

when that service is provided by an incumbent LEC were higher ($798.80)[11] than when the service is provided by a competitive LEC ($388.75).[12]

Of course, DS-1 service is only one component of the total package of telecommunications services purchased by business customers. The service package also will include local and long distance services, features such as conference calling or voice mail, and Internet services. Estimates of pricing for such packages of services were obtained from various Internet web sites that provide quotes from several service vendors for service packages.[13] The prices quoted for service packages including local and long distance service for 6 lines, with DS-1 rate Internet access, ranged from approximately $800 to $1,900. For purposes of this study, an estimated average monthly price for the DS-1 service package of $1,000 was used. This amount was scaled for each state by the variance in each state's DS-1 UNE loop and transport rates from the national average DS-1 UNE loop and transport rate. Note, however, that the recurring rates charged for DS-1 UNE loops and transport are only one cost faced by CLECs in providing integrated telecommunications services. Substantial costs also are incurred in operating switching and long distance transport facilities, in providing Internet connectivity, in provisioning vertical services such as voice mail and conferencing, and in marketing, billing, and selling services.

The economic impact of cost increases imposed by elimination of DS-1 UNEs was estimated using a model that simulates the current competitive conditions in the market for DS-1 services. The behavioral assumption of the model is that the CLECs currently act to constrain the prices that may be charged by the ILECs, and that CLECs have established retail prices equal to their long-run marginal cost. This model estimates the effect in the market caused by an increase in the CLECs' cost by shifting the CLEC supply curve upward by the amount of this cost increase. Then it recalculates the equilibrium prices and quantities that maximize the dominant firm's profits. This is intended to demonstrate the long-run outcome in the marketplace, once all of the firms have had time to adjust the scale of their operations to the new, higher cost of doing business.

For purposes of this case study, we calibrated the model as follows:

- The market demand curve is linear, with demand elasticity equal to –1.0 at the initial market equilibrium. (This is consistent with the demand elasticity used in the Rappaport/Taylor Special Access study[14]).
- The dominant firm's marginal cost is constant at approximately $500.
- The fringe supply curve is linear with intercept set at the current assumed market rate in each state.

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11 *Id.*, Figure 42.

12 *Id.*, Figure 41.

13 See, for example, http://geoquote.net/

14 Rappaport, P., *et. al., op. cit.* p. 6.

The results of the model are most sensitive to the supply elasticity of the fringe, and whether the CLECs effectively constrain the ILECs under current market conditions, but we believe our calibration to be the most reasonable. Another complication that could be introduced into the model is to account for the differentiated pricing and products offered by the CLECs and ILECs. In any event, there is no reasonable scenario under which the harm to the CLEC industry and to consumer welfare would be markedly lower than the one presented in this paper.

IV. Results

The gross cost impact to CLECs of forced migration to Special Access services from DS-1 UNEs is an immediate $2 billion annually, as shown in Table 2.

Table 2
Cost Impact to CLECs of Migration to Special Access

	CLEC DS-1s	Monthly Cost Impact/Line	Total Annual Cost Impact
Alabama	6,663	$277.43	$22,183,761
Arizona	9,583	$245.32	$28,211,194
Arkansas	3,366	$291.54	$11,775,581
California	62,665	$141.95	$106,743,335
Colorado	9,671	$365.41	$42,405,417
Delaware	2,149	$370.88	$9,562,443
District of Columbia	2,881	$18.53	$640,660
Florida	22,685	$232.60	$63,318,373
Georgia	13,631	$371.87	$60,826,058
Idaho	2,124	$293.01	$7,466,813
Illinois	22,182	$712.14	$189,557,049
Indiana	7,667	$793.07	$72,965,019
Iowa	3,711	$188.39	$8,390,432
Kansas	4,029	$298.66	$14,440,585
Kentucky	4,152	$235.64	$11,741,284
Louisiana	8,152	$252.38	$24,687,613
Maine	2,674	$376.65	$12,087,716
Maryland	13,950	$411.88	$68,950,022
Massachusetts	15,121	$318.26	$57,747,975
Michigan	15,015	$817.88	$147,366,607
Minnesota	7,063	$269.10	$22,807,218
Mississippi	4,635	$297.76	$16,561,975
Missouri	8,920	$315.94	$33,818,927
Montana	1,412	$290.23	$4,915,927
Nebraska	1,368	$301.48	$4,950,501
Nevada	1,482	$285.05	$5,067,644
New Hampshire	2,738	$359.51	$11,812,669
New Jersey	23,659	$427.66	$121,417,428
New Mexico	3,282	$343.38	$13,524,994
New York	40,915	$343.40	$168,604,120

North Carolina	8,824	$284.19	$30,093,132
North Dakota	618	$275.08	$2,041,449
Ohio	12,812	$747.37	$114,901,481
Oklahoma	5,524	$149.89	$9,935,217
Oregon	4,740	$269.34	$15,318,653
Pennsylvania	21,645	$368.35	$95,675,742
Rhode Island	2,057	$289.65	$7,151,308
South Carolina	5,344	$244.09	$15,653,302
South Dakota	774	$282.37	$2,623,841
Tennessee	9,292	$264.26	$29,465,758
Texas	30,973	$307.48	$114,281,561
Utah	3,720	$329.64	$14,713,247
Vermont	1,372	$430.48	$7,086,124
Virginia	12,110	$444.98	$64,663,855
Washington	8,853	$354.97	$37,712,476
West Virginia	3,085	$33.16	$1,227,406
Wisconsin	6,797	$748.76	$61,074,383
Wyoming	878	$282.98	$2,981,685
Total	466,964		$1,991,149,961

CLECs, of course, could not sustain this cost increase but would be forced to raise prices, which would result in a loss of market share, and in most cases to their exit from the market, because of a variety of factors; most of which stem from the fact that the ILECs would not raise prices to accommodate the full cost increase experienced uniquely by the CLECs.[15]

Using the dominant firm-competitive fringe model we demonstrate a possible new equilibrium in the market. In this new equilibrium, the price for DS-1 service increases, on average, by 25% and, in all but two states, the CLEC must exit the market for DS-1 services. The overall decrease in the benefits to small and medium-sized business from their telecommunications purchases, i.e. consumer welfare, amounts to $4.9 billion annually. Faced with such a massive increase in their telecommunications costs, small and medium businesses will be forced to raise substantially the prices they charge for their own products, and thus will propagate further throughout the economy the inflationary price increases instigated by the ILECs. Table 3 presents the results of the model by state.

[15] See, *e.g.*, n. 8, *supra*.

Table 3
Retail Price Change Resulting from Elimination of DS-1 UNEs

	Initial Price	New Equilibrium Price	Percent Price Change	Annual Dollar Change in Consumer Surplus
Alabama	$1,038.65	$1,288.65	24.07%	$(75,938,552)
Arizona	$1,052.36	$1,297.68	23.31%	$(107,627,974)
Arkansas	$1,015.04	$1,265.04	24.63%	$(38,235,100)
California	$999.48	$1,141.43	14.20%	$(428,228,000)
Colorado	$932.27	$1,182.27	26.82%	$(108,490,000)
Delaware	$993.41	$1,243.41	25.17%	$(24,334,300)
District of Columbia	$1,345.76	$1,364.29	1.38%	$(2,747,560)
Florida	$1,083.48	$1,316.08	21.47%	$(244,089,000)
Georgia	$944.21	$1,194.21	26.48%	$(153,211,000)
Idaho	$1,004.67	$1,254.67	24.88%	$(24,089,900)
Illinois	$969.44	$1,219.44	25.79%	$(250,316,000)
Indiana	$918.51	$1,168.51	27.22%	$(85,809,600)
Iowa	$1,109.29	$1,297.68	16.98%	$(33,157,400)
Kansas	$1,007.92	$1,257.92	24.80%	$(45,726,300)
Kentucky	$1,080.44	$1,316.08	21.81%	$(45,174,000)
Louisiana	$1,063.70	$1,313.70	23.50%	$(93,195,800)
Maine	$1,022.59	$1,272.59	24.45%	$(30,411,800)
Maryland	$952.41	$1,202.41	26.25%	$(157,009,000)
Massachusetts	$1,046.49	$1,296.49	23.89%	$(172,495,000)
Michigan	$883.20	$1,133.20	28.31%	$(166,995,000)
Minnesota	$1,028.58	$1,278.58	24.31%	$(80,380,300)
Mississippi	$1,018.32	$1,268.32	24.55%	$(52,679,700)
Missouri	$990.64	$1,240.64	25.24%	$(100,981,000)
Montana	$1,007.45	$1,257.45	24.82%	$(16,016,300)
Nebraska	$996.20	$1,246.20	25.10%	$(15,502,700)
Nevada	$909.48	$1,159.48	27.49%	$(16,556,000)
New Hampshire	$1,039.73	$1,289.73	24.05%	$(31,207,400)
New Jersey	$936.63	$1,186.63	26.69%	$(265,607,000)
New Mexico	$954.30	$1,204.30	26.20%	$(36,952,200)
New York	$1,001.47	$1,251.47	24.96%	$(463,909,000)
North Carolina	$1,031.89	$1,281.89	24.23%	$(100,473,000)
North Dakota	$1,022.60	$1,272.60	24.45%	$(7,033,510)
Ohio	$953.71	$1,203.71	26.21%	$(144,226,000)
Oklahoma	$1,156.69	$1,306.58	12.96%	$(40,124,100)
Oregon	$1,028.34	$1,278.34	24.31%	$(53,937,400)
Pennsylvania	$995.94	$1,245.94	25.10%	$(245,224,000)
Rhode Island	$1,109.59	$1,359.59	22.53%	$(23,652,200)
South Carolina	$1,071.99	$1,316.08	22.77%	$(59,901,400)
South Dakota	$1,015.31	$1,265.31	24.62%	$(8,796,910)
Tennessee	$1,051.81	$1,301.81	23.77%	$(106,072,000)
Texas	$999.10	$1,249.10	25.02%	$(351,056,000)
Utah	$968.04	$1,218.04	25.83%	$(41,963,900)
Vermont	$968.76	$1,218.76	25.81%	$(15,478,900)
Virginia	$919.31	$1,169.31	27.19%	$(135,556,000)
Washington	$942.71	$1,192.71	26.52%	$(99,490,300)
West Virginia	$1,331.13	$1,364.29	2.49%	$(5,234,280)
Wisconsin	$962.82	$1,212.82	25.97%	$(76,629,200)
Wyoming	$1,014.70	$1,264.70	24.64%	$(9,974,600)
Total				$(4,891,896,586)

V. Conclusions

Elimination of UNE DS-1 loops and transport would deal a staggering blow to nascent facilities-based competition, crippling the competitive carriers who supply DS-1 services to small and medium-sized businesses. The loss of most or all customers in this market segment would threaten continued financial viability of existing facilities-based carriers. The feasibility of investment in switches and supporting facilities is dependent on obtaining sufficient customer volume to defray the large fixed investment component in such facilities. As the market share of competitive carriers has increased, those carriers have been able to transition from UNE-P based services to facilities-based services. The loss of substantial customer volume that would result from the elimination of the availability of DS-1 UNE loops and transport would invalidate the assumptions under which investments in switches and supporting facilities were made. Even if existing facilities-based CLECs were able to weather the change for a short period of time, further investment in switching facilities by CLECs would certainly be discouraged.

Elimination of UNE DS-1 loops and transport would impose substantial costs on small and medium-sized businesses. As noted above, CLECs serve approximately 23% of the market for DS-1 services. According to the SBA small business survey, small businesses obtaining service from CLECs realize significant cost savings relative to small businesses that obtain service from ILECs. Elimination of the availability of DS-1 UNEs would directly impose significant costs on small and medium-sized businesses, to the tune of more than $4.9 billion annually and increase inflationary pressures in the economy.

Indirect costs also may be imposed on business customers as a result of the loss of integrated DS-1 services provided by CLECs, combining voice and data where previously business had relied on ILEC analog services. While these costs cannot easily be quantified, they could well be higher than the direct costs that have been estimated by this study.